4.7 NOISE

This section of the Final Environmental Impact Report (EIR) presents a brief discussion of the generation and characteristics of sound and how sound is measured, followed by a characterization of the existing ambient sound levels in the Shell Martinez Marine Terminal (Shell Terminal) Lease Consideration Project (Project) area, and identification of sensitive receptors. Applicable regulations of the local community are also discussed.

The operation of the Shell Terminal produces both mobile and stationary source noise emissions. Mobile source noise emissions are associated with the operation of ships and tugs/barges that call on the Shell Terminal. Stationary source noise is associated with Shell Terminal operations, ~~which includes~~ such as noise associated with ships while hoteling, various pumps, and operation of the Marine Vapor Recovery (MVR) system. The impacts analysis compares these operations to the local regulations to determine ~~whether~~ if continued operation of the Shell Terminal would exceed established noise criteria.

4.7.1 Environmental Setting

Characteristics of Sound

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

The decibel (dB) scale (a logarithmic loudness scale) is used to quantify sound intensity in a convenient and manageable manner. Because the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called “A-weighting,” written as dBA. In accordance with published literature, the human ear can detect changes in sound levels of approximately 3 dBA under normal ambient conditions. Changes of 1 through 3 dBA are noticeable to some people under quiet conditions, while changes of less than 1 dBA are only discernable by few people under controlled, extremely quiet conditions. A change of 5 dBA is readily discernable to most people in an exterior environment.

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road with moving vehicles. Because the area of the sound wave increases as the sound gets farther and farther from the source, less energy strikes any given point over the surface area of the wave. This phenomenon is known as “spreading loss.” Because of spreading losses, noise attenuates (decreases) with distance. The typical atmospheric spreading loss rate for point source noise is 6 dBA per doubling of the distance.

A line source will also attenuate with distance, but the rate of attenuation is a function of both distance and, due to reflection and absorption, the type of terrain over which the noise passes. Over hard sites, such as developed areas with paving, noise attenuates at a rate of 3 dBA per doubling of the distance. Over soft sites, such as undeveloped areas, open space, and vegetated areas, noise attenuates at a rate of 4.5 dBA per doubling of the distance.

These represent the extremes and most line source noise is produced in areas ~~which will actually~~ that contains a combination of both hard and soft elements, with the noise attenuation placed somewhere in between these two attenuation factors. The only way to actually determine the absolute amount of attenuation that an area provides is through field measurement under operating conditions with simultaneous noise level measurements conducted at varying distances from a constant noise source.

Objects that block the line-of-sight attenuate the noise source if the receptor is located within the "shadow" of the blockage (such as behind a sound wall). If a receptor is located behind the wall, but has a view of the source, the wall will do little to attenuate the noise. Additionally, a receptor located on the same side of the wall as the noise source may experience an increase in the perceived noise level because the wall can reflect noise back to the receptor, compounding its effect.

Time variation in noise exposure is typically expressed in terms of the average energy over time (called L_{eq}), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example: ~~,~~

- ~~t~~ The L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour.
- Similarly, the L_{08} represents the noise level that is exceeded 8 percent of the time or 5 minutes per hour.

These "L" values are typically used to demonstrate compliance for stationary noise sources with a city's Noise Ordinance. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or the day/night average noise level (L_{dn}). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. through 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. through 7:00 a.m. The L_{dn} descriptor uses the same methodology, except that there is no artificial increment added to the hours between

7:00 through 10:00 p.m. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher).

Noise Characteristics of the Project Area

The Shell Terminal is a heavy industrial facility not immediately surrounded by any other facilities. The lightly developed area is characterized by wildlife preserves, the Carquinez Strait shoreline, and several heavy industrial facilities. The primary noise source in the Project area is generated from mobiles sources, (i.e., vessel and road traffic, railroad, and aircraft). Secondary noise sources include commercial and industrial activities (e.g., terminal and refinery operations both at Shell and other local facilities).

To ascertain the existing noise at and adjacent to the Project site, field monitoring was conducted on Thursday, November 17, 2005. The field survey noted that noise in the Project area is dominated by mobile sources (e.g., local roadway traffic, boating and shipping traffic, railroad activities, and aircraft overflights). However, shore activities along the north side of the Carquinez Strait were also audible in the background.

Noise monitoring was performed using a Quest Technologies Model 2900 Type 2 Integrating/logging Sound Level Meter. The unit meets the American National Standards Institute (ANSI) Standard S1.4-1983 for Type 2, International Electrotechnical Commission (IEC) Standard 651-1979 for Type 2, and IEC Standard 651-1979 for Type 2 sound level meters. The unit was field calibrated at 10:35 a.m. using a Quest Technologies QC-10 calibrator immediately prior to the first set of readings. The calibration was then rechecked at 2:51 p.m. after the readings and no meter "drift" was noted. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment.

The study included six noise readings. The L_{eq}, L_{min}, L_{max}, L_{02}, L_{08}, L_{25} and L_{50} values were recorded. As discussed above, the L_{eq} value is representative of the equivalent noise level or logarithmic average noise level obtained over the measurement period. The L_{min} and L_{max} represent the minimum and maximum root-mean-square noise levels obtained over a period of one second. The L_{02}, L_{08}, L_{25}, and L_{50} represent the values that are exceeded 2, 8, 25, and 50 percent of the time or 1, 5, 15 and 30 minutes per hour if the readings were extrapolated out to an hour's duration. The monitoring locations are shown in Figure 4.7-1 and the readings are included in Table 4.7-1 and summarized below.

1 Figure 4.7-1. Noise Monitoring Locations

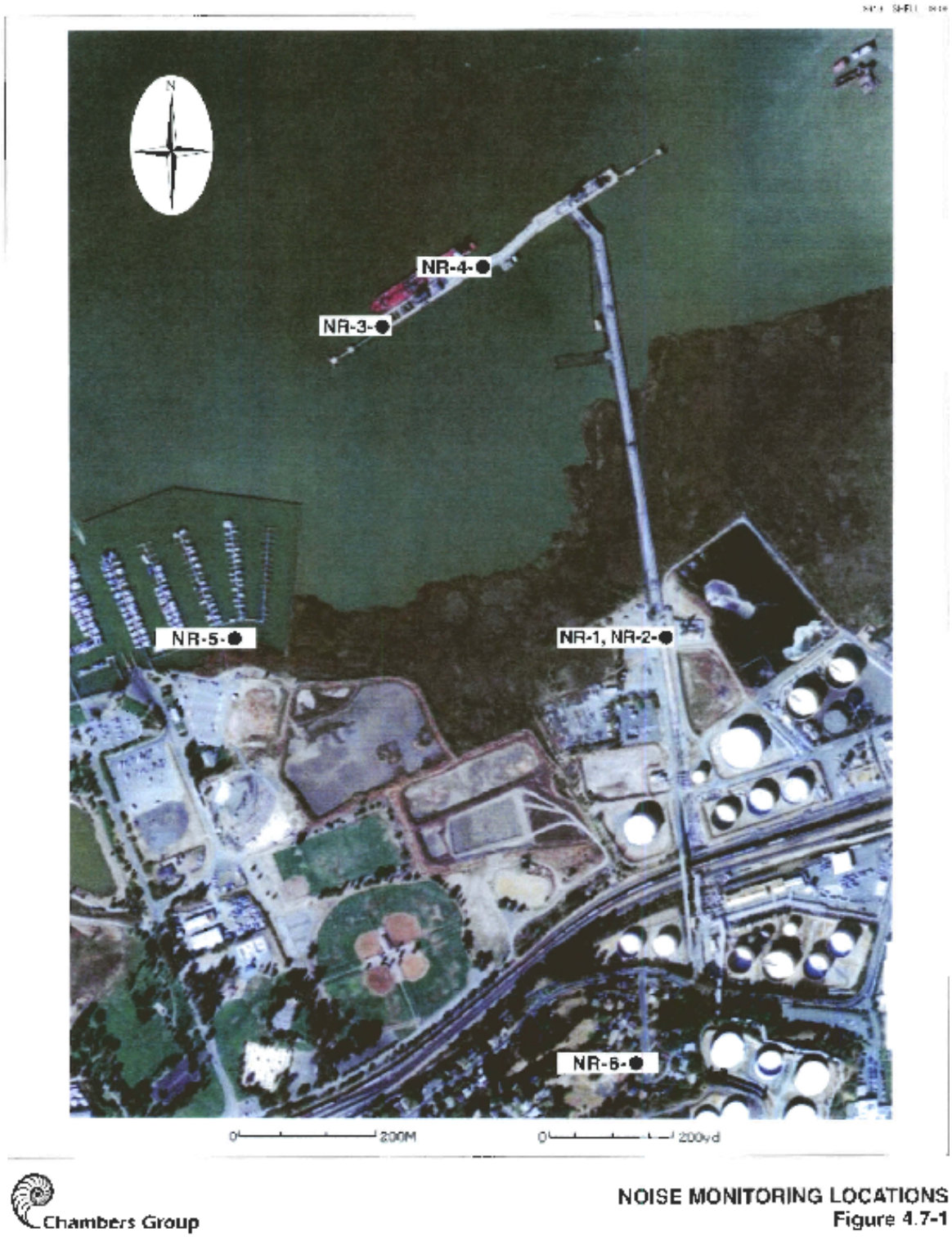

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Table 4.7-1. Noise Level Measurements

Monitoring Location	L_{eq} (dBA)	L_{02} (dBA)	L_{08} (dBA)	L_{25} (dBA)	L_{50} (dBA)	L_{min} (dBA)	L_{max} (dBA)
NR-1	59.0	68.2	63.2	57.8	55.3	51.2	69.3
NR-2	74.4	75.3	75.0	74.7	74.5	72.9	75.9
NR-3	56.3	60.8	58.6	56.6	55.2	52.5	68.2
NR-4	63.9	64.7	64.3	64.1	63.9	62.9	66.5
NR-5	50.0	53.1	51.5	50.4	49.7	47.0	59.7
NR-6	52.2	61.3	55.6	51.4	48.5	44.9	64.8

[1] The L_{eq} represents the equivalent sound level and is the numeric value of a constant level that over the given period of time transmits the same amount of acoustic energy as the actual time-varying sound level. The L_{02}, L_{08}, L_{25}, and L_{50} are the levels that are exceeded 2, 8, 25, and 50 percent of the time, respectively. Alternatively, these values represent the noise level that would be exceeded for 1, 5, 15 and 30 minutes during a 1-hour period. The L_{min} and L_{max} represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second.

Source: Synectecology, November 2005

NR-1 – This reading was obtained to characterize the noise associated with the MVR located toward the south end of the Shell Terminal. The meter was placed on-site, 100 feet west of the system. The 15-minute reading was obtained from 10:40 a.m. During the reading the MVR was not active. Ambient noise included local plant operations and the regular release of steam from a check valve located about 8 feet from the metered location. Note that spot readings confirmed that this steam release produced an instantaneous noise level of about 69 dBA and was responsible for the 69.3 dBA L_{max} value.

NR-2 – This reading was obtained in the same location as NR-1. However, in this case the two blowers associated with the MVR system were in operation. The 15-minute reading was obtained from 10:58 a.m. The difference in L_{eq} between readings NR-1 and NR-2 confirms that the MVR was in fact the primary noise source. If the ambient level obtained in reading NR-1 is subtracted out of reading NR-2, the MVR produces a noise level of 74.3 dBA L_{eq}. For the purposes of this analysis, the value of 74.4 dBA L_{eq} as measured at a distance of 100 feet is used for MVR noise.

NR-3 – This reading was obtained at the southwest corner of Berth #3. The ship *KWK ESTEEM* was moored and "hoteling" in Berth #1, the bow of which was located approximately 100 feet from the monitored location. A 15-minute reading was obtained from 11:30 a.m. From this location, the ship's engines were not readily discernable. Ambient noise included the frequent discharge of steam traps located along the Shell Terminal, railroad horns and activities, and background traffic, primarily from vehicles traversing the Benicia-Martinez Bridge.

NR-4 – This reading was obtained in proximity to the engine area of the ship *KWK ESTEEM* approximately 600 feet from the southwest corner of the Shell Terminal Berth #3. The meter was placed approximately 110 feet from the ship, and the engines were operational. The 15-minute measurement began at

11:50 a.m. Ambient noise included the ship's engines engaged in hoteling activity and noted discharge of steam traps located along the Shell Terminal.

NR-5 – This reading was along the floating access way leading to the east end of the Martinez Marina. The marina supports pleasure craft that are large enough for live-aboard and extended stay, and as such, could be considered as a potentially sensitive land use. A 15-minute reading was obtained from 2:05 p.m. Ambient noise included on-going Shell Terminal operations located across Carquinez Strait and west of the Benicia-Martinez Bridge, local railroad operations, aircraft overflights, and the "clanking" of boat halyards against their masts.

NR-6 – This reading was in front of the residential unit located at 202 Miller Avenue, located on a steep hillside adjacent to the Refinery and overlooking the Shell Terminal. The meter was placed 60 feet north of Dineen Street. The reading is representative of the closest residential structures to the south of the Shell Terminal. The 15-minute reading began at 2:34 p.m. Ambient noise included on-going Shell Terminal operations located across the bay, local traffic, passing railroad trains, and aircraft overflights. Additionally, one car passed the meter at a distance of about 20 feet during the reading.

Sensitive Receptors

There are no sensitive land uses (such as hospitals, retirement communities, or schools) located near the Shell Terminal. The nearest residential area is approximately 0.33 mile (1,750 feet) to the south of the MVR and 0.74 mile (3,900 feet) south of the Shell Terminal berths. As noted above, a 15-minute L_{eq} level of 52.2 dBA was obtained along Miller Avenue in front of the residential unit (location NR-6 on Figure 4.7-1).

Additionally, the Martinez Marina is located to the southwest of the Shell Terminal. The marina includes boats large enough to support live-aboard tenants. The nearest slips in the marina are located approximately 0.40 mile (2,100 feet) west of the MVR and about 0.23 of a mile (1,200 feet) southwest of the Shell Terminal Berth 3. Noise monitoring showed a 15-minute L_{eq} of 50.0 dBA at the marina.

4.7.2 Regulatory Setting

Introduction

Generally, Federal and State agencies regulate mobile noise sources, and local agencies regulate stationary noise sources and activities. Federal and State agencies regulate noise from mobile sources by establishing and enforcing noise standards on vehicle manufacturers. Local agencies regulate noise through three principal means: enforcement of local noise ordinances; implementation of noise-related policies contained in the local general plan, such as noise/land use compatibility guidelines; and enforcement of noise-related conditions on permit approvals.

Federal Regulations/Standards

The U.S. Environmental Protection Agency (EPA) has developed guidelines on recommended maximum noise levels to protect public health and welfare (EPA 1974). The EPA does not enforce these regulations, but rather offers them as a planning tool for State and local agencies. Table 4.7-2 provides examples of protective noise levels recommended by the EPA.

Table 4.7-2. EPA Designated Noise Safety Levels

Effect	Level	Area
Hearing Loss	L_{eq} (24)<70 dB	All areas
Outdoor Activity Interference and Annoyance	L_{dn} <55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	L_{eq} (24)<55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor Activity Interference and Annoyance	L_{dn} <45 dB	Indoor residential areas
	L_{eq} (24)<45 dB	Other indoor areas with human activities such as schools, etc.
Source: EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974. **Notes:** **L_{eq} (24) =** Represents the sound energy averaged over a 24-hour period. **L_{dn} =** Represents the L_{eq} with a 10 dB nighttime weighting.		

The Federal Office of Safety and Health Administration (OSHA) regulates exposure to occupational noise (29 Code of Federal Regulations [CFR] Ssection 1910.95) by limiting the interval of time a worker can be exposed to certain noise levels. These regulations list permissible noise exposure levels as a function of the amount of time to which the worker is exposed. For example, a worker should not be exposed to average sound levels of 90 dBA for over 8 hours. When noise exposure exceeds this, employers should reduce exposure conditions with engineering or administrative methods. If exposure time cannot be reduced, protective equipment is required to reduce noise levels to permissible levels.

Any facility (such as the Shell Terminal) or construction effort is subject to a Health and Safety Plan outlining measures to reduce worker exposure to excessive noise. Worker noise exposure is not addressed further in this document.

State Laws and Regulations

The California Government Code § 65302(f) encourages each local government entity to conduct noise studies and implement a noise element as part of ~~their~~ its General Plan. In addition, the California Office of Planning and Research (OPR) published guidelines (OPR 1990) for evaluating the compatibility of various land uses as a function of community noise exposure, and these are listed in Table 4.7-3.

Table 4.7-3. Land Use Compatibility for Community Noise Environment

Land Use Category	Community Noise Exposure – L_{dn} or CNEL (dB~~b~~)						
	50	55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Home							
Residential – Multi-Family							
Transient Lodging – Motel, Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

The California Office of Safety and Health Administration (Cal/OSHA) also regulates employee noise exposure, as mandated by California Code of Regulations (CCR) Title 8, Group 15, Article 105 §§ 5095-5100. Cal/OSHA stipulates the same requirements as Federal OSHA (above). Additionally, a Hearing Conservation Program must be instituted when employees are exposed to noise levels of an 8-hour time weighted average at or greater than 85 dBA.

Regional and Local Regulations and Standards

The Shell Terminal is located on CSLC jurisdictional tidelands adjacent to the City of Martinez in Contra Costa County, and both sets of standards would apply to the proposed Project. Furthermore, because noise does not recognize artificial boundaries, the analysis also examines the standards applicable to Solano County located across Carquinez Strait, north of the proposed Project. The applicable standards are detailed in

Table 4.7-4 below. Contra Costa County follows the State of California land use compatibility guidelines (shown in Table 4.7-3) in ~~their~~ its General Plan Noise Element (Contra Costa County 2005). The City of Martinez adopted Ordinance No. 1288 C.S. Chapter 8.34 (Noise Control) to the Martinez Municipal Code on September 5, 2001 (City of Martinez 2001) to implement the goals of the Noise Element of the General Plan. Acceptable standards are outlined in § 8.34.020. Solano County noise policies are described in the General Plan Health and Safety Element (Solano County 1977, pp. 17-23).

Table 4.7-4. Summary of Regional and Local Regulations and Standards

Source	Level	Area
Contra Costa County General Plan Noise Element	L_{dn} or CNEL = 60 dBA	Low-density residential areas.
	L_{dn} or CNEL = 65 dBA	Multi-family residential areas.
	L_{dn} or CNEL = 75 dBA	Water recreation and Industrial land uses.
City of Martinez Noise Ordinances	L_{dn} = 45 dB	Interior noise levels (35 dBA between 10:00 p.m. and 7:00 a.m. and 45 dBA between 7:00 a.m. and 10:00 p.m.).
	L_{dn} = 60 dB	Exterior noise levels (50 dBA between 10:00 p.m. and 7:00 a.m. and 60 dBA between 7:00 a.m. and 10:00 p.m.).
Solano County General Plan Health and Safety Element	CNEL = 45 to 70 dBA	Commercial land uses (wholesale, industrial, manufacturing, utilities, etc.).

4.7.3 Impact Significance Criteria

Impacts are considered adverse and significant if the Project noise levels exceed the local noise ordinances, or any applicable noise regulations promulgated on the State or Federal level. For this analysis, impacts from noise would be considered significant if:

- Applicable local standards, noise elements, or ordinances would be exceeded in noise level, timing, or duration. These include:
  - The Contra Costa County General Plan Noise Element states that the maximum CNELs of 60, 65, and 75 dBA for low-density, medium density, and industrial land uses, respectively.
  - The Martinez City noise ordinance's standard for industrial areas limits noise offsite to 70 dBA. Residential areas are subject to a standard of 60 dBA L_{dn} (60 dBA L_{eq} between the hours of 7:00 a.m. and 10:00 p.m. and 50 dBA L_{eq} between the hours of 10:00 p.m. and 7:00 a.m.).
  - The Solano County General Plan Health and Safety Element states that commercial land uses have an acceptable noise range of 45 to 70 dBA CNEL.
- The Project would increase the ambient noise level above ordinance-specified limits by more than 5 dBA (substantial increase), or by 3 dBA in areas already exceeding ordinance-specified limits.

4.7.4 Impact Analysis and Mitigation Measures

Impact N-1: Existing Consistency With Local Standards, Noise Elements and Ordinances

Because the Shell Terminal already exists, it is considered part of the ambient noise environment. While it is located in an industrial area, sensitive receptors are located within the City of Martinez to the south. Over the lease period, no new sensitive receptors would be expected to be constructed proximate to the Shell Terminal. Impacts would be adverse, but less than significant (Class III).

The primary sources of noise associated with the Shell Terminal are from the operation of the MVR system located toward the south side of the Shell Terminal as well as the blower systems located along the berthing area. These levels may be inferred from the data obtained during field measurement NR-3 that documented the noise associated with the operation of the MVR. This reading displayed a L_{eq} value of 74.4 dBA as measured at a distance of 100 feet.

The *Martinez City Noise Ordinances* provide acceptable standards for noise levels. New commercial or industrial development located within 500 feet of a residential development must be designed and operated within the acceptable standards (City of Martinez 2001~~2~~). The Shell Terminal is located in an industrial area, and other industrial uses and open space areas dominate the surrounding area. Because the Shell Terminal already exists, it is considered part of the ambient noise environment and not a new facility.

The *Contra Costa County General Plan Noise Element* states that the normally acceptable range for industrial land uses is 50 to 75 dBA CNEL. Contra Costa County sets a single-family residential standard of 60 dBA L_{dn}. Multi-family residential areas are subject to a 65 dBA L_{dn} standard. These residential standards are raised to 70 dBA L_{dn} where trains provide the primary source of noise. Industrial areas are subject to a standard of 75 dBA L_{dn}.

Proximate Residents Located in Non-Conforming Land Use

The most proximate residential units are located to the south at a distance of about 0.33 mile (1,750 feet) to the south of the MVR and 0.74 mile (3,900 feet) south of the Shell Terminal berths. These most proximate homes are located along Miller Avenue, Front Street, Lang Street, and Dineen Street, and are actually located on land zoned for heavy industrial use, and therefore represent a non-conforming land use that is subject to the City of Martinez industrial noise standard of 70 dBA and a Contra Costa County Standard of 75 dBA L_{dn}.

Based on these distances, MVR noise is calculated at 49.5 dBA L_{eq} at the residents. Assuming that berthing, pumping, and vapor evacuation activities at the berth produce a similar noise level, at a distance of about 0.74 mile (3,900 feet), this noise would be

reduced to no more than 42.6 dBA L_{eq}. The combined noise level at the most proximate residential structures is then calculated at 50.3 dBA L_{eq}. Because operations take place continually for a period of 24 hours, the L_{dn} is calculated at 56.7 dBA and the operation of the Shell Terminal is within the 60 dBA L_{dn} for sensitive land uses and the industrial area standards. The actual level could be quieter than the predicted value, due to intervening structures and topography that can partially obstruct the noise. As such, even if nighttime noise levels were to exceed the 50 dBA standard, it would not exceed the appropriate industrial standard and the impact is less than significant (Class III). Furthermore, because the Shell Terminal and its operation already exist, it is considered part of the ambient noise environment.

Proximate Residents Located in Residential Zoned Land Use

The most proximate residential units located in an area zoned for residential development are located further to the west of the homes located in the Miller Avenue area. The nearest of these homes are located at a distance of about 0.38 mile (2,000 feet) from the MVR and 0.74 mile (3,900 feet) from the Shell Terminal berths.

Based on these distances, MVR noise is calculated at 48.4 dBA at the residents. Again, assuming that pumping and vapor evacuation activities at the berth produce a similar noise level, at a distance of about 0.74 mile (3,900 feet) this noise would be reduced to no more than 42.6 dBA L_{eq}. The combined noise level at the most proximate residential structures is then calculated at 49.4 dBA L_{eq}. This value remains under both the 50 dBA nighttime and 60 dBA daytime standards for residential land use areas. Again assuming that this level is generated continuously, the L_{dn} is calculated at 55.8 dBA and is well under the 60 dBA L_{dn} standards for residential land uses, and is adverse, but less than significant (Class III). Again, the actual level could be quieter than the predicted value, due to intervening structures and topography that may partially obstruct the noise.

Martinez Marina

In addition to sensitive dwellings, the Martinez Marina is located to the southwest of the Shell Terminal. The marina includes boats large enough to support live-aboard tenants. The near point of the marina is located approximately 0.40 mile (2,100 feet) west of the MVR and its noise is calculated at 48.0 dBA L_{eq} at the nearest slips. Additionally, the most proximate slips are located at a distance of about 0.23 mile (1,200 feet) from the west end of the berthing area and this noise is calculated at 52.8 dBA L_{eq}. Assuming the simultaneous use of the MVR and berthing operations, the composite L_{eq} is calculated at 54.0 dBA. This level is less than 60 dBA daytime standard, but exceeds the 50 dBA nighttime standard for residential development areas. Assuming that this noise is produced continuously, the L_{dn} is calculated at 60.4 dBA. This level is well below the City of Martinez 70 dBA standard and Contra Costa County 75 dBA L_{dn} standard for industrial uses, and while the value exceeds the 60 dBA L_{dn} for residential land use areas, any live-aboards would be considered a non-conforming land use. Impacts are considered adverse, but less than significant (Class III).

The *Solano County General Plan Health and Safety Element* (1977) states that commercial land uses have an acceptable noise range of 45 to 70 dBA CNEL. The near shoreline across the Carquinez Straight is approximately 0.54 mile (2,850 feet) from the Shell berthing area and about 0.97 mile (5,100 feet) from the MVR. At these distances, the combined noise from Shell Terminal activities is calculated at 46.5 dBA L_{eq}. Assuming this level ~~were~~was produced continuously through the day and night, the CNEL is calculated at 53.2 dBA. This is value well within the acceptable range for industrial use areas. Therefore, all impacts due to the proposed Project are adverse, but less than significant (Class III).

N-1: No mitigation is required.

Impact N-2: Future Consistency with Local Standards, Noise Elements and Ordinances Over the 30-Year Lease Period

Over the 30 years of the lease period, Shell Terminal operations could increase from 196 to as many as 330 average annual ship and barge visits raising the current noise level. Impacts would be adverse, but less than significant (Class III).

Currently, a tanker will spend from 32 to 40 hours at berth while a barge typically averages between 12 and 20 hours. Assuming each tanker spends 36 hours and each barge spends 16 hours at berth, the Shell Terminal is active 4,756 hours per year, or an average of 13 hours per day. Over the 30-year lease period, Shell Terminal operations could increase to as many as 330 ships and barges per year. Assuming a similar ratio of tankers to barges and that berthing times remain constant, 136 tankers and 194 tankers would call on the facility averaging 8,000 hours per year or about 22 hours per day. At full operation, the Shell Terminal could still operate at one ship per day, and for most days, future operations would not elevate existing Shell Terminal noise on a daily basis. Impacts are adverse, but less than significant (Class III).

However, if it is assumed that the noise is proportional to the absolute number of hours at berth, the noise produced at the berth would be increased by 2.3 dBA representing an increase of 68 percent. Because the noise monitored at the MVR included the simultaneous use of both blowers, its noise would not increase.

Proximate Residents Located in Non-Conforming Land Use

The most proximate residential units are located to the south at a distance of about 0.33 mile (1,750 feet) to the south of the MVR and 0.74 mile (3,900 feet) south of the Shell Terminal berths, in an area zoned for heavy industrial use.

Based on the noted distance, MVR noise is calculated at 49.5 dBA L_{eq} at the residents. If the existing noise associated with activities at the berth is raised by 2.3 dBA, at a distance of about 0.74 mile (3,900 feet), this noise would be reduced to no more than 44.9 dBA L_{eq}. The combined noise level at the most proximate residential structures is then calculated at 50.8 dBA L_{eq}. Because operations take place continually for a period

of 24 hours, the L_{dn} is calculated at 57.2 dBA and the operation of the Shell Terminal is within the 60 dBA L_{dn} for sensitive land uses. The actual level could be quieter than the predicted values due to intervening structures and topography that can partially obstruct the noise, reducing its level. Again, it must be recognized that these most proximate homes that lie along Miller Avenue and its adjoining streets are actually located on land zoned for heavy industrial use, and therefore represent a non-conforming land use that is subject to the City of Martinez 70 dBA L_{dn} standard and the Contra Costa County 75 dBA L_{dn} standard. As such, even if nighttime noise levels were to exceed the 50 dBA standard, they would not exceed the appropriate industrial standard and the impact is adverse, but less than significant (Class III).

Proximate Residents Located in Residential Zoned Land Use

The most proximate residential units located in an area zoned for residential development are located further to the west. The nearest of these homes are located along Escobar Street at a distance of about 0.38 mile (2,000 feet) from the MVR and 0.74 mile (3,900 feet) from the Shell Terminal berths.

Based on these distances, MVR noise is calculated at 48.4 dBA L_{eq} at the residents. Again, assuming that berth operations are increased by 2.3 dBA over existing levels, at a distance of about 0.74 mile (3,900 feet) this noise would be reduced to no more than 44.9 dBA L_{eq}. The combined noise level at the most proximate residential structures is then calculated at 50.0 dBA L_{eq}. This value is well under the City of Martinez 60 dBA L_{eq} daytime standard and meets the 50 dBA nighttime standard for residential land use areas. The actual level could be lower due to intervening topography and structures. Again assuming that this level is generated continuously, the L_{dn} is calculated at 56.4 dBA and is well under the City of Martinez 60 dBA L_{dn} standard for residential land uses, and impacts are adverse, but less than significant (Class III). In addition, this value ~~and~~ is well under the Contra Costa County 65 dBA L_{dn} standard for multi-family residential land uses as well as the more stringent 60 dBA threshold for single family residential areas, and the impact is adverse, but less than significant (Class III).

Martinez Marina

In addition to sensitive dwellings, the Martinez Marina would be subject to augmented noise levels. The nearest point of the marina ~~are~~is located approximately 0.40 mile (2,100 feet) west of the MVR and its noise is calculated at 48.0 dBA L_{eq} at the nearest slips. The proximate berth is located at a distance of about 0.23 mile (1,200 feet) from the west end of the berthing area and at 330 vessels per year, this noise is calculated at 55.1 dBA L_{eq}. Assuming the simultaneous use of the MVR and berthing operations, the composite L_{eq} is calculated at 55.9 dBA. This level is less than 60 dBA daytime standard, but exceeds the 50 dBA nighttime standard for residential development areas. Assuming that this noise is produced continuously, the L_{dn} is calculated at 62.3 dBA. This level is well below the both the City of Martinez and Contra Costa County 75 dBA L_{dn} for water recreational areas and the 70 dBA L_{dn} for industrial uses, as any live-

aboards would be considered as a non-conforming land use. Impacts from the proposed Project are adverse, but less than significant (Class III).

The *Solano County General Plan Health and Safety Element* states that commercial land uses have an acceptable noise range of 45 to 70 dBA CNEL. The near shoreline across the Carquinez Straight is approximately 0.54 mile (2,850 feet) from the Shell Terminal berthing area and about 0.97 mile (5,100 feet) from the MVR. Again assuming that the noise associated with berthing operations is increased by 2.3 dBA, the combined noise is calculated at 48.3 dBA L_{eq}. Assuming this level was produced continuously through the day and night, the CNEL is calculated at 55.0 dBA. This value is well within the acceptable range for industrial land uses. Therefore, proposed Project impacts are adverse, but less than significant (Class III).

N-2: No mitigation is required.

Impact N-3: Stationary Source and Mobile Source Noise

No substantial permanent increase in ambient noise levels in the Project vicinity above existing levels would occur from increased operations over the 30-year lease period. Impacts would be adverse, but less than significant (Class III).

Stationary-Source Noise

At full operation, the Shell Terminal could still operate at one ship per day, and on most days, future operations would not elevate existing Shell Terminal noise. Impacts are adverse, but less than significant (Class III). However, if it is assumed that the noise is proportional to the absolute number of hours at berth, the noise produced at the berth would be increased by 2.3 dBA representing an increase of 68 percent. Because the noise monitored at the MVR included the simultaneous use of both blowers, its noise would not increase.

Proximate Residents Located in Non-Conforming Land Use

The most proximate residential units are located to the south at a distance of about 0.33 mile (1,750 feet) to the south of the MVR and 0.74 mile (3,900 feet) south of the Shell Terminal berths in an area zoned for heavy industrial use.

Based on these distances, and assuming continual operations throughout the day and night, Shell Terminal-related noise would increase from 56.7 to 57.2 dBA L_{dn} representing an increase of 0.5 dBA L_{dn}. Because the ambient noise includes other sources than the operation of the Shell Terminal, the actual increase in the ambient noise would be far less than the 0.5 increase attributable to the augmented operation at the Shell Terminal. Still, the increase is well under the 5 dBA threshold for a substantial increase, as well as the 3 dBA threshold in areas already exceeding ordinance-specified limits. Impacts are adverse, but less than significant (Class III).

Proximate Residents Located in Residential Zoned Land Use

The most proximate residential units located in an area zoned for residential development located along Escobar Street are at a distance of about 0.38 mile (2,000 feet) from the MVR and 0.74 mile (3,900 feet) from the Shell Terminal berths.

Based on these distances, and assuming that Shell Terminal noise is generated continuously, the L_{dn} from Shell Terminal activities would increase from 55.8 to 56.4 dBA representing a 0.6 dBA increase. Again, the actual ambient level would not increase by 0.6 dBA L_{dn} as Shell Terminal operations only make up a portion of the entire ambient noise. Again, the increase is well under the 5 dBA threshold for a substantial increase, as well as the 3 dBA threshold in areas already exceeding ordinance-specified limits, and the impact is adverse, but less than significant (Class III).

Martinez Marina

In addition to sensitive dwellings, noise would increase at the Martinez Marina. The proximate berth is located at a distance of about 0.23 mile (1,200 feet) from the west end of the berthing area and at 330 vessels per year, the L_{dn} is calculated to increase from 60.4 to at 62.3 dBA representing an increase of 1.9 dBA CNEL. Again, the actual ambient level would not increase by 1.9 dBA L_{dn} as Shell Terminal operations only make up a portion of the entire ambient noise. Still, the increase is well under the 5 dBA threshold for a substantial increase, as well as the 3 dBA threshold in areas already exceeding ordinance-specified limits, and the impact is adverse, but less than significant (Class III).

Mobile-Source Noise

Similar to the increase in stationary-source noise generated at the Shell Terminal, the increase in operations could result in increases in mobile-source noise including marine vessels and on-road vehicles. Like berthing operations discussed above, the noise associated with ships and barges that call on the Shell Terminal would also increase by 68 percent or 2.3 dBA L_{eq}.

However, because the vessels that call on the Shell Terminal represent only a portion of the vessels traffic through the Carquinez Strait, the ambient noise associated with vessel traffic would not increase by 2.3 dBA. Table 3.2-1 (Section 3.2, Cumulative Projects) notes that there are currently about 3,101 vessels per year or about 8.5 per day through the Carquinez Strait. The increased operations at the Shell Terminal would result in an additional 134 vessels per year or about 0.4 per day. This then represents an increase of about 5 percent in the total number of marine vessel operations and an increase of about 0.2 dBA CNEL.

Similarly, increased operations at the Shell Terminal could increase the number of trucks that call on the Shell Refinery. However, the number of new trips would be minimal and to raise ambient levels along the roads by the threshold level of 3 dBA would require that Shell Terminal operations double the average daily traffic volumes.

This level of increase would not occur and any impact associated with increased vehicle traffic is adverse, but less than significant (Class III).

N-3: No mitigation is required.

Impact N-4: Future Dredging Operations

To accommodate the increase in vessel traffic over the 30-year lease, the area in and around Berths #3 and #4 may require dredging. Noise from any nighttime dredging has the potential to significantly impact receptors at the Martinez Marina (Class II).

Two types of short-term noise impacts could occur during this dredging activity. First, the transport of workers to the site would incrementally increase noise levels on access roads leading to the site. This noise is preempted from local regulation and therefore exempt from the noise ordinance. Furthermore, only a few workers would be required for dredging operations. Therefore, the short-term construction-related impacts associated with worker travel to the proposed Project site would result in an adverse, but less than significant impact (Class III) on existing noise levels and on any noise sensitive receptors along the access routes used by the vehicles traveling to the Project site.

The second type of short-term noise impact is related to noise generated during dredging operations. The dredge would use diesel engines for propulsion, dredging activities, and to provide on-board electric power. Dredge operations are projected to occur 24-hours per day, 7 days per week. Either the dredge would be self-powered or a tug boat would be used to position the unit. The noise produced by a cutterhead dredge is based on data obtained by Mestre Greve and documented by Helix Environmental (*Upper Newport Bay Unit III Sediment Control and Enhancement Project, Volume II Initial Study Technical Appendices*, October 15, 1996). That report addressed the use of a 500 horsepower (hp) hydraulic dredge and measured a noise level of 67 dBA at a distance of 100 feet. The proposed Project could use a dredge that is as much as 10 times more powerful than the unit measured by Helix. Assuming that the noise level is directly related to the power level, dredge noise would be approximately 10 dBA louder than that measured by Helix and here a value of 77 dBA as measured at 100 feet is assumed for dredging operations.

This level is also confirmed based on data provided in the *Phase I 2020 Plan and Feasibility Study Channel Improvements and Landfill Development EIS/EIR* (September 1990). The 2020 Plan monitored the noise associated with an 18,000 hp dredge at 81 dBA at a distance of 100 feet. Again assuming that the noise level is directly related to the horsepower level, a 5,000 hp dredge would be approximately 5.6 dBA quieter, or about 75.4 dBA at 100 feet. As such, the use of a value of 77 dBA as measured at a distance of 100 feet represents a reasonable estimate of projected dredging noise.

The most proximate homes are approximately 0.61 mile (3,200 feet) from potential dredging activities inside of Berth #3. Based on an assumed level of 77 dBA at 100 feet, noise at the homes is calculated at 46.9 dBA L_{eq}. This value is less than the City of

Martinez 60 dBA daytime standard as well as the more stringent 50 dBA nighttime standard, and the impact is adverse, but less than significant (Class III).

Noise at the Martinez Marina would also be augmented during dredging operations. The near slips could be on the order of 800 feet from dredging operations. At this distance, dredging noise is estimated at about 58.3 dBA L_{eq}. This level is within the City of Martinez 60 dBA daytime standard but exceeds the City of Martinez nighttime standard of 50 dBA, and the impact would be potentially significant (Class II).

Mitigation Measures for N-4:

N-4. Any dredging to be performed within 0.42 mile (2,250 feet) of any sensitive land use or live-aboard boat shall be restricted to between the hours of 7:00 a.m. and 10:00 p.m.

Rationale for Mitigation: Sensitive receptors located within 0.42 mile (2,250 feet) of dredging would be subject to exceedance of the City of Martinez nighttime standard of 50 dBA if dredging would be allowed to occur between 10:00 p.m. and 7:00 a.m. Adherence to the designated hours will allow the dredging activity to occur within the allowable local noise ordinance without significant impacts. The hours are set such that construction noise, including dredging, can proceed, while still respecting the rights of sensitive receptors during the night.

4.7.5 Impacts of Alternatives

Impact N-5: No Project Alternative

With no new lease, noise associated with the Shell Terminal would cease, resulting in a slight beneficial impact (Class IV). Decommissioning of the Shell Terminal would be subject to short term construction noise impacts that would be adverse, but less than significant (Class III).

Under the No Project Alternative, Shell's lease would not be renewed and the existing Shell Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Shell Terminal would follow an Abandonment and Restoration Plan as described in Section 3.3.1, No Project Alternative.

Under the No Project Alternative, alternative means of crude oil/product transportation would need to be in place prior to decommissioning of the Shell Terminal, or the operation of the Shell Refinery would cease production, at least temporarily. It is more likely, however, that under the No Project Alternative, Shell would pursue alternative means of traditional crude oil transportation, such as a pipeline transportation, or use of a different marine terminal. Accordingly, this ~~Draft~~ EIR describes and analyzes the potential environmental impacts of these alternatives. For the purposes of this ~~Draft~~ EIR, it has been assumed that the No Project Alternative would result in a

decommissioning schedule that would consider implementation of one of the described transportation alternatives. Any future crude oil or product transportation alternative would be the subject of a subsequent application to the CSLC and other agencies having jurisdiction, depending on the proposed alternative.

Decommissioning would be assumed to be accomplished primarily via the water with materials taken away via barge, other than those that can be used at the Shell Refinery. The deconstruction process during decommissioning would require demolition of the structure which would produce noise impacts as a result of tearing, sustained hammering, or other activities associated with the decommissioning process. The activity would be subject to the local noise ordinance that would restrict construction to allowed hours, and, thus, would be adverse, but less than significant (Class III). The activity would also be subject to a separate CEQA review.

With no new lease, noise as described for the proposed Project would cease, resulting in a slight beneficial impact (Class IV). Similar noise impacts would occur at another marine terminal. The severity of noise impact would depend on the distance to any sensitive noise receptors and other ambient noise sources.

N-5: No mitigation is required.

Impact N-5: Full Throughput Alternative

Increased operations at other marine oil terminals and pipelines would be subject to the local noise ordinances. New pipeline construction could result in significant (Class II) impacts if located within 0.27 mile (1,400 feet) of sensitive receptors.

Construction Noise Impacts

Any existing terminals that may require modifications would be subject to their local noise ordinance. Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there would be a relatively high single event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet), the increase in noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact (Class III) on noise receptors along the truck routes.

Second, short-term noise emissions associated with terminal modifications could be approximately 89 dBA as measured at a distance of 50 feet (USEPA 1971) and the 60-dBA daytime standard noise level would occur at a distance of about 0.27 mile (1,400 feet). In all probability, no sensitive land uses would be within this distance and any impact would be adverse, but less than significant (Class III).

Construction of the associated pipelines would have the potential to result in significant (Class II) impacts. In addition, new pipelines would need to be constructed to transport

petroleum liquids from the terminal(s) to the Shell Refinery. This construction would produce a similar noise level as above. Depending on the chosen route, based on a worst-case scenario, construction could occur within 0.27 mile (1,400 feet) of sensitive land uses, producing a significant (Class II) impact for the duration of construction.

Operations Noise Impacts

Noise produced at any modified terminal is expected to be similar to that at the existing Shell Terminal, and any impact would be based on the location of the noise and its proximity to sensitive land uses. This would be the subject of a separate CEQA document, but it is expected that any potential impacts could be reduced to a less than significant (Class III). Because any necessary pipelines would be buried and would not emit audible noise, no other noise impacts (other than those noted) are expected with this alternative.

Mitigation Measures for N-5:

N-5. All construction activities shall adhere to local noise ordinance limitations.

Rationale for Mitigation: Adherence to the designated hours will allow the construction activity to occur within the allowable local noise ordinance without significant impacts. The hours are set such that construction can proceed, while still respecting the rights of sensitive receptors during the night and on weekends.

4.7.6 Cumulative Projects Impacts Analysis

Impact CUM-N-1: Cumulative Noise

Cumulative projects in the region comprise the ambient noise environment throughout the Bay area. Shell Marine Terminal continued operations would result in an adverse, but less than significant (Class III) noise impact to the cumulative environment.

Unless two projects occur in close proximity to each other, their noise is not additive. While most projects identified as being cumulative are located at distances such that their combined noise does not manifest itself in any sensitive areas, noise generated across the Carquinez Strait in the area of the Port of Benicia was audible at the homes located along Miller Avenue as well as at the Martinez Marina during the field study.

Assuming that all operations through the Carquinez Strait including those at the Port of Benicia were to increase at the same rate as that noted for the Shell Terminal, (i.e., 68 percent over 30 years), the overall increase in ambient noise would be approximately 2.3 dBA. The increase is less than the 3 dBA threshold considered as detectable and the cumulative increase is not significant. As such, cumulative noise would result in an adverse, but less than significant (Class III) impact.

CUM-N-1: No mitigation is required.

Table 4.7-5 summarizes noise impacts and mitigation measures.

Table 4.7-5. Summary of Noise Impacts and Mitigation Measures

Impacts	Mitigation Measures
N-1: Consistency with Local Standards, Noise Elements and Ordinances	No mitigation required.
N-2: Future Consistency with Local Standards, Noise Elements and Ordinances Over the 30-Year Lease Period	No mitigation required.
N-3: Stationary Source and Mobile Source ~~Noise Substantial Permanent Increase in Ambient Noise Levels in Project Vicinity Above Levels Existing without Project~~	No mitigation required.
N-4: Future Dredging Operations ~~Substantial Temporary or Periodic Increase in Ambient Noise Levels in Project Vicinity Above Levels Existing without Project~~	**N4**: Any dredging to be performed within 2,250 feet of any sensitive land use or live-aboard boat shall be restricted to between the hours of 7:00 a.m. and 10:00 p.m.
N-5: No Project Alternative	No mitigation required.
N-6: Full Throughput Alternative	**N-6:** All construction activities shall adhere to local noise ordinance limitations.
CUM-N-1: Cumulative Noise	No mitigation required.